CLAIMS

1. A voltage-to-current converter including (1) a differential amplifier having non-inverting and inverting inputs, and (2) associated circuitry for (a) applying an input voltage signal to the converter and (b) deriving from the associated circuitry an output signal current for driving a load; a sensing resistor series connected with the load and having opposite first and second terminals for respectively applying voltages to first and second feedback loops; the loops being respectively associated with the non-inverting and inverting inputs of the differential amplifier; each of the loops including (a) an intermediate tap connected to a respective input of the differential amplifier, and (b) a first branch including a first resistor connected between the intermediate point associated with the particular feedback loop and the terminal of the sensing resistor associated with the particular feedback loop; whereby the sensing resistor is connected between the first branches of the first and second feedback loops; each of the loops also including a second branch having a second resistor connected between the intermediate point associated with the particular feedback loop and an input port of the converter circuit; the first resistors in the feedback loops have resistance values that are of the same order of magnitude and are substantially higher than the resistance values of the sensing resistor and the load; whereby the current adapted to flow across the sensing resistor is an output current signal directly proportional to the input voltage signal applied between input ports of the second branches of the first and the second feedback loops.

2. The converter of claim 1, wherein said input voltage signal is adapted to be applied to the input port of the second branch of said first feedback loop, and the input port of said second branch of said second feedback loop is connected to the ground.

3. The converter of claim 1, wherein the input ports of the second branches of said first and second voltage feedback loops are input ports for said conversion circuit having said input voltages signal applied therebetween in a differential arrangement.

4. The converter of claim 1, wherein the first resistors in said first branches of said first and second feedback loops have identical resistance values.

5. The converter of claim 1, wherein said first and second feedback loops include voltage dividers having respective voltage divider ratios defined by said first resistor in said first branch and said second resistor in said second branch, and wherein said respective voltage dividers are the same for said first and second feedback loops.

6. The converter of claim 1, wherein said first branch in said first feedback loop is connected to the output of said differential amplifier.

7. The converter of claim 1, wherein said intermediate point in said first feedback loop is connected to the inverting input of said differential amplifier.

8. The converter of claim 1, wherein said first branch of said second feedback loop is connected between said sensing resistor and said load.

9. The converter of claim 1, wherein said intermediate point in said second feedback loop is connected to the non-inverting input of said differential amplifier.

10. The converter of claim 10, further including a ramp signal generator for selectively applying to the input port of one of the second branches of one of said first and second feedback loops a ramp signal for gradually reducing said output current signal.

11. The circuit of claim 10, further including a laser source connected to the converter as the load.

12. The circuit of claim 11, further including a current drive circuit for said laser source, said drive circuit being connected to between the output of said differential amplifier and said sensing resistor and in series with the laser source.

13. A circuit comprising an output terminal for connection to a load; an amplifier arrangement having an output terminal and inverting and non-inverting input terminals, the amplifier arrangement being arranged for deriving at the output terminal thereof an output voltage having a magnitude directly proportional to the difference in the voltages at the inverting and non-inverting output terminals; first and second voltage dividers; a sensing resistor connected between the circuit output terminal and the amplifier arrangement output terminal; a first feedback path connected between the output terminal of the amplifier arrangement and one of the input terminals of the amplifier arrangement; a second feedback path connected between the output terminal of the circuit and the other input terminal of the amplifier arrangement; the first feedback circuit being included in a first resistive voltage divider connected between the circuit input terminal and the output terminal of the amplifier arrangement; the second feedback circuit being included in a second resistive voltage divider connected between a further terminal and the circuit output terminal; the first voltage divider having a first tap connected to drive the first input terminal of the amplifier arrangement; the second voltage divider having a second tap connected to drive the second input terminal of the amplifier arrangement; the voltage dividers having voltage division factors and the sensing resistor having a value for causing the current flowing through the circuit output terminal into the load to be directly proportional to the difference in the voltages at the

circuit input terminal and the further terminal; the resistance of the first voltage divider between the output and first input terminals of the amplifier arrangement and the resistance of the second voltage divider between the circuit output terminal and the second input terminal of the amplifier arrangement being on the same order of magnitude and much greater than the resistance of the sensor resistance.

14. The circuit of claim 13 wherein the further terminal is at ground potential.

15. The circuit of claim 13 wherein the further terminal is connected to be responsive to a voltage source having a voltage other than ground.

16. The circuit of claim 13 further including a bias source, the load including a laser diode connected between the circuit output terminal and the bias source; the bias source, laser diode, circuit output terminal, sensing resistor and amplifier arrangement being arranged for causing current to flow from the bias source through the laser diode, circuit output terminal and sensing resistor into the output terminal of the amplifier arrangement.

17. A circuit comprising an output terminal for connection to a load; an amplifier arrangement having an output terminal and inverting and non-inverting input terminals, the amplifier arrangement being arranged for deriving at the output terminal thereof an output voltage having a magnitude directly proportional to the difference in the voltages at the inverting and non-inverting output terminals; first and second voltage dividers; a sensing resistor connected between the circuit output terminal and the amplifier arrangement output terminal; a first feedback path connected between the output terminal of the amplifier arrangement and one of the input terminals of the amplifier

arrangement; a second feedback path connected between the output terminal of the circuit and the other input terminal of the amplifier arrangement; the first feedback circuit being included in a first resistive voltage divider connected between the circuit input terminal and the output terminal of the amplifier arrangement; the second feedback circuit being included in a second resistive voltage divider connected between a further terminal and the circuit output terminal; the first voltage divider having a first tap connected to drive the first input terminal of the amplifier arrangement; the second voltage divider having a second tap connected to drive the second input terminal of the amplifier arrangement; the voltage dividers having voltage division factors and the sensing resistor having a value for causing the current flowing through the circuit output terminal into the load to be directly proportional to the difference in the voltages at the circuit input terminal and the further terminal; the first and second input terminals being respectively the non-inverting and inverting input terminals of the amplifier arrangement.

18. The circuit of claim 17 wherein the further terminal is connected to ground and the circuit input terminal is connected to a voltage source.

19. The circuit of claim 17 wherein the further and input terminals are respectively connected to first and second voltage sources.

20. The circuit of claim 17 wherein the amplifier arrangement is arranged so the gain factor polarity between inverting and non-inverting input terminals and the output terminals of the amplifier arrangement causes the output current of the amplifier arrangement to be directly proportional to and have the same polarity as (V_A-V_B),

where V_A and V_B are respectively the voltages at the non-inverting and inverting input terminals.

21. The circuit of claim 17 wherein the load includes a laser diode having first and second electrodes respectively connected to be responsive to the voltages of a non-grounded terminal of a DC voltage source and the circuit output terminal, the DC voltage source polarity and the laser diode polarity being such that DC current is adapted to flow between the DC voltage source ungrounded terminal and the circuit output terminal via the laser diode.

22. The circuit of claim 21 wherein the amplifier arrangement is arranged so the gain factor polarity between inverting and non-inverting input terminals and the output terminals of the amplifier arrangement causes the output current of the amplifier arrangement to be directly proportional to and have the same polarity as (V_A-V_B), where V_A and V_B are respectively the voltages at the non-inverting and inverting input terminals.

23. A circuit comprising an output terminal for connection to a load; an amplifier arrangement having an output terminal and inverting and non-inverting input terminals, the amplifier arrangement being arranged for deriving at the output terminal thereof an output voltage having a magnitude directly proportional to the difference in the voltages at the inverting and non-inverting output terminals; first and second voltage dividers; a sensing resistor connected between the circuit output terminal and the amplifier arrangement output terminal; a first feedback path connected between the output terminal of the amplifier arrangement and one of the input terminals of the amplifier arrangement; a second feedback path connected between the output terminal of the circuit and the other input terminal of the amplifier arrangement; the first feedback circuit

being included in a first resistive voltage divider connected between the circuit input terminal and the output terminal of the amplifier arrangement; the second feedback circuit being included in a second resistive voltage divider connected between a further terminal and the circuit output terminal; the first voltage divider having a first tap connected to drive the first input terminal of the amplifier arrangement; the second voltage divider having a second tap connected to drive the second input terminal of the amplifier arrangement; the voltage dividers having voltage division factors and the sensing resistor having a value for causing the current flowing through the circuit output terminal into the load to be directly proportional to the difference in the voltages at the circuit input terminal and the further terminal; the laser diode having first and second electrodes respectively connected to be responsive to the voltage of a non-grounded terminal of a DC voltage source and the circuit output terminal, the DC voltage source polarity and the laser diode polarity being such that DC current is adapted to flow between the DC voltage source ungrounded terminal and the circuit output terminal via the laser diode.

24 The circuit of claim 23 wherein the further terminal is connected to ground and the circuit input terminal is connected to a voltage source.

25. The circuit of claim 23 wherein the further and input terminals are respectively connected to first and second voltage sources.

26. The circuit of claim 23 wherein the amplifier arrangement is arranged so the gain factor polarity between inverting and non-inverting input terminals and the output terminals of the amplifier arrangement causes the output current of the amplifier arrangement to be directly proportional to and have the same polarity as (V_A-V_B),

where V_A and V_B are respectively the voltages at the non-inverting and inverting input terminals.

27. A circuit comprising an output terminal for connection to a load; an amplifier arrangement having an output terminal and inverting and non-inverting input terminals, the amplifier arrangement being arranged for deriving at the output terminal thereof an output voltage having a magnitude directly proportional to the difference in the voltages at the inverting and non-inverting output terminals; first and second voltage dividers; a sensing resistor connected between the circuit output terminal and the amplifier arrangement output terminal; a first feedback path connected between the output terminal of the amplifier arrangement and one of the input terminals of the amplifier arrangement; a second feedback path connected between the output terminal of the circuit and the other input terminal of the amplifier arrangement; the first feedback circuit being included in a first resistive voltage divider connected between the circuit input terminal and the output terminal of the amplifier arrangement; the second feedback circuit being included in a second resistive voltage divider connected between a further terminal and the circuit output terminal; the first voltage divider having a first tap connected to drive the first input terminal of the amplifier arrangement; the second voltage divider having a second tap connected to drive the second input terminal of the amplifier arrangement; the voltage dividers having voltage division factors and the sensing resistor having a value for causing the current flowing through the circuit output terminal into the load to be directly proportional to the difference in the voltages at the circuit input terminal and the further terminal; the resistance (R_1) of the first voltage divider between the output and first input terminal of the amplifier arrangement being of the same order of magnitude as the resistance of the second voltage divider between the

circuit output terminal and the second terminal of the amplifier arrangement, the resistance (R_2) of the first voltage divider between the first input terminal of the amplifier arrangement and the circuit input terminal being of the same order of magnitude as the resistance between the second input terminal of the amplifier arrangement.

28. The circuit of claim 27 wherein R_1 is much greater than the resistance of the sensing resistor.

29. The circuit of claim 27 wherein the further terminal is connected to ground and the circuit input terminal is connected to a voltage source.

30. The circuit of claim 27 wherein the further and the input terminals are respectively connected to the first and second voltage sources having values that are not zero.

31. The circuit of claim 27 wherein the amplifier arrangement is arranged so the gain factor polarity between inverting and non-inverting input terminals and the output terminals of the amplifier arrangement causes the output current of the amplifier arrangement to be directly proportional to and have the same polarity as (V_A-V_B), where V_A and V_B are respectively the voltages at the non-inverting and inverting input terminals.

32. The circuit of claim 27 wherein the load includes a laser diode having first and second electrodes respectively connected to be responsive to the voltage of a non-grounded terminal of a DC voltage source and the circuit output terminal, the DC voltage source polarity and the laser diode polarity being such that DC current is adapted to flow between the DC voltage source ungrounded terminal and the circuit output terminal via the laser diode.

33. The circuit of claim 32 wherein the amplifier arrangement is arranged so the gain factor polarity between inverting and non-inverting input terminals and the output terminals of the amplifier arrangement causes the output current of the amplifier arrangement to be directly proportional to and have the same polarity as (V_A-V_B), where V_A and V_B are respectively the voltages at the non-inverting and inverting input terminals.